On the Extraction Operation

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ON THE

EXTRACTION OPERATION

WITH SPECIAL REFERENCE

TO THE

USE OF THE ELEVATOR

BY

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PREFACE.

It is commonly said that the great failings of professional men are egotism and its twin-brother dogmatism. In the following pages it has been my special anxiety that those who trouble to read them may do so with the feeling that they represent only my personal opinions and convictions, and are but an exposition of methods with which I have had success ; but that I should be the first to admit that other methods and instruments may be wielded by those who have practised them with equal, or possibly greater, satisfaction.

Some of the diagrams are new, but for the majority I am indebted to the kindness of Messrs. C. Ash and Sons.

G. Mulready Keevil.

20, *Weymouth Street,*
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On the Extraction Operation, with Special Reference to the Use of the Elevator.

CHAPTER I.

INTRODUCTORY REMARKS.

IT is not proposed in a small work of this kind, which will only reach the hands of those more or less accustomed to the handling of surgical instruments, to dwell in detail on such matters as the necessity for the cleanliness and sterilisation of such instruments; nor will it be necessary in these days, when instruments are all more or less well made, to discuss minutely the vast variety of sizes and shapes characterising those emanating from different makers; each practitioner will select, or have made, forceps over whose handles he feels he has most control. In this connection, it may be ventured that there is a tendency to make the blades of forceps too sharp or razor-like, with the inevitable result that they "turn"; indeed, it is to the credit of the makers that those forceps are of such a proper temper that they do not do one of two other alternatives, either break themselves or the tooth.

The forceps of Everard, whom almost all of those who have used them call the Prince of forcep makers, were quite blunt at the edge, and were even clumsy in appearance, but from handle to blade they were absolutely rigid, with the exception of slight lateral play at the joint, and control over them was perfect. It would seem that the general pattern of Everard's forceps, with one or two modern additions to be mentioned later on, still represent the most desirable form of instruments for common use, and to be very hard to improve upon.

There are, however, one or two points in considering the principles of extraction which cannot be too strongly insisted upon, if such a word may be allowed in a work which has already disclaimed any idea of insistence ; and first among these is the axiom that the main or chief movement in the removal of a tooth from its socket is of a lifting or elevating character, and that any movement of a wrenching nature is quite inadmissible : any lateral movement which may be necessary to assist in bringing about the detachment of the tooth from its surroundings should be used in combination with the lifting movement only in so far as it may be regarded as the withdrawal of the tooth in the line of the least resistance.

There are, perhaps, occasional exceptions, which will be touched upon in the proper place, but even in these the principle remains the same.

Next, in these days of universal and constant use of anæsthetics, is the wisdom of cultivating the ability to remove the greatest number of teeth with the smallest number of instruments. Not uncommonly is it possible to complete a case with one forcep alone, where another less finished, but perhaps no less skilled operator will require three or four ; and this is one point which tells heavily in favour of the frequent use of the straight elevator ; indeed, the author has seen every tooth, from incisors to molar roots (wisdom teeth excepted), in both upper and lower jaws, removed with the aid of this almost miraculous instrument alone.

The position of the operator and of his left-hand fingers with regard to the patient will be noted as the extraction of each class of tooth is remarked upon, but it may be at once stated that the position on the left side of the patient is improper, and necessity for it so very rarely, if ever, arises, that it may be placed out of court. Another point which cannot be too strongly emphasised, is that the tooth to be removed, having once been grasped, the eye should never leave it whilst it is so grasped, particularly should the patient be under a general anæsthetic.

The proper observation of this rule would have obviated all the extractions of wrong teeth, or of two teeth instead of one.

Lastly, it may be urged that no operation should be commenced upon a second tooth at the same sitting until the first one operated upon be outside the mouth, whether the patient be under an anæsthetic or no.

CHAPTER II.

OF THE REMOVAL OF THE UPPER INCISORS.

THE forcep which the author considers of most value for the removal of the upper incisors, both temporary and permanent, is that known as Read's pattern for upper roots.

This forcep has the inestimable advantage of preventing the hand from hiding the light, in addition to which the slightly eccentric motion which the angle of the instrument gives to the requisite rotation movement is just that which is most suited to the earliest removal of the tooth. The stump forcep itself as sold, is a very suitable one, but one which is slightly heavier in the blades is perhaps more desirable for this particular purpose.

The operator, standing to the right of the patient, should place his left forefinger along the anterior alveolar plate, and the thumb behind the tooth, thereby holding the lip out of the way, and at the same time being in the best position to secure the tooth, should it, as sometimes happens, leap from its socket when the blades of the forcep are tightened upon it.

The forcep should be applied lightly to the neck of the tooth, and pushed up toward the root as far as possible, the handles being then grasped just sufficiently tightly to prevent them from slipping on the surface of the tooth, rotation backwards and forwards on the long axis of the tooth is made, accompanied by a movement pulling the tooth straight from its socket.

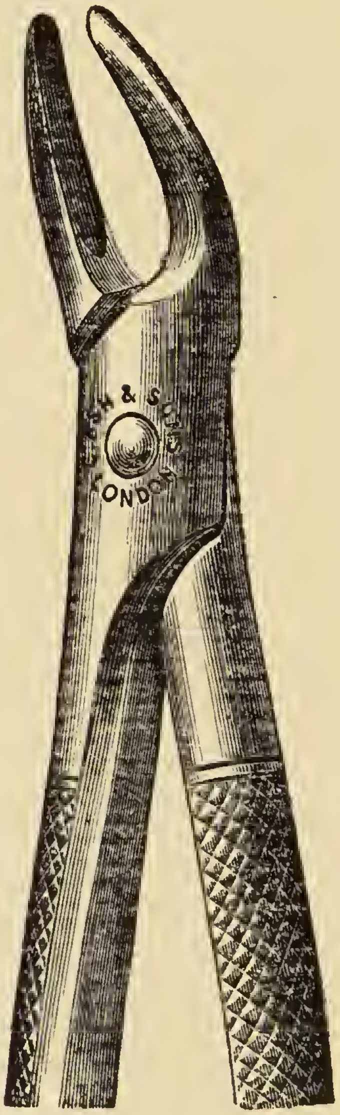


Fig. 1.—Read's Upper Stump Forcep.

The foregoing applies to such incisor teeth and roots as may readily be grasped by such a forcep as described. Cases sometimes occur in which temporary incisors are decayed flush with the gum margins; in such cases the same Read forcep may be used, great care being taken not to push it too far so as to interfere in any way with the succeeding permanent tooth.

Cases of this kind also occur in combination with a condition in which the apices of the temporary roots are being forced obliquely through the gums by the oncoming permanent teeth; such cases are best met by inserting the blade of a straight elevator under the points and pushing them out, care being taken that the hand using the instrument is under control, by resting the third and fourth fingers on the patient's lower teeth, if firm, or upon the other hand. The use of a lancet to make a preliminary incision in these cases is to be deprecated, such young patients being, not surprisingly, very intolerant of such proceedings.

A class of case is not infrequently met with in which the root canal has become so disintegrated by decay that nothing but a frail and hollow cone of soft dentine and cementum remains; these cases often present considerable difficulty, which may, however, be sometimes overcome by filling the cone with gutta-percha or cement, and extracting carefully in the usual way. But if, from any cause, this cannot be done, then a thin enamel chisel, curved on the flat, may be insinuated between the root and the alveolus, and the root gently prised from its socket, either as a whole or in fragments, or the latter may be removed with the dressing forcep.

CHAPTER III.

Of the Removal of the Lower Incisors.

This operation is one which rarely, if ever, presents any difficulties. The forcep in general use is of the hawk's-bill pattern, and is undoubtedly the most desirable, although the old-fashioned straight instrument, so called, has the advantage in these cases of permitting the operator to remain more to the side of the patient, and therefore of avoiding the obstruction of light and view by his arm.

The operator should stand somewhat more to the front of the patient than in the case of the upper incisors, and the left hand is best utilised in the following manner. The thumb being placed under the chin as a support, the forefinger is to be laid along the anterior or labial alveolus, keeping the lip out of the way, whilst the second finger is performing the same office for the tongue, by being interposed along the lingual alveolar plate.

The forcep, having been applied to the tooth, is forced downwards in the direction of the long axes of the blades, care being taken that the handles are sufficiently tight to prevent any possibility of the blades passing outside the alveolus. The tooth being grasped then as far down as may be, is lifted by the power of the wrist and arm upwards and outwards, a slight movement of rotation on the long axis of the tooth assisting its removal.

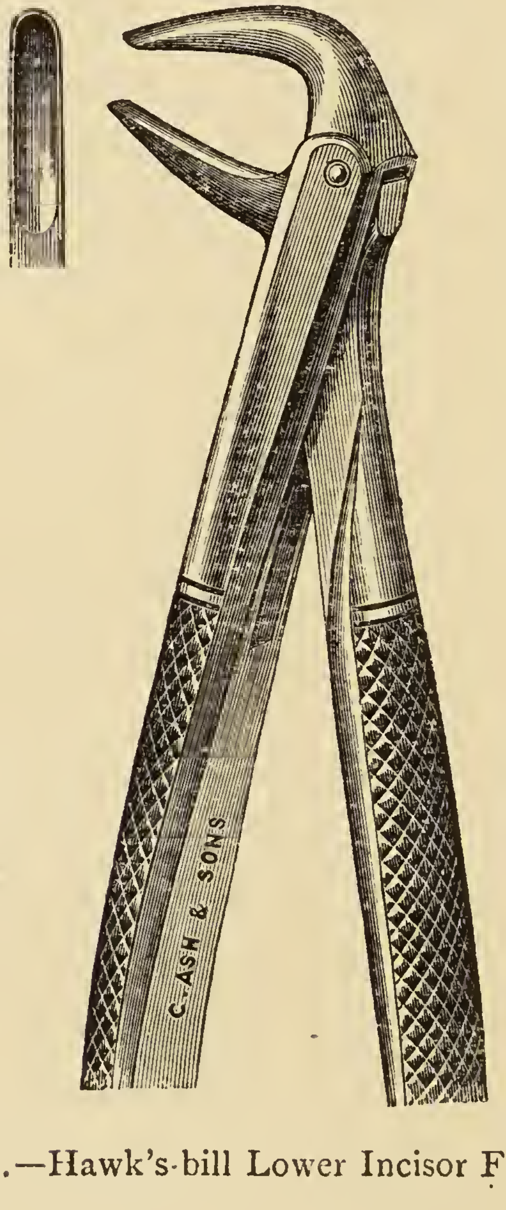
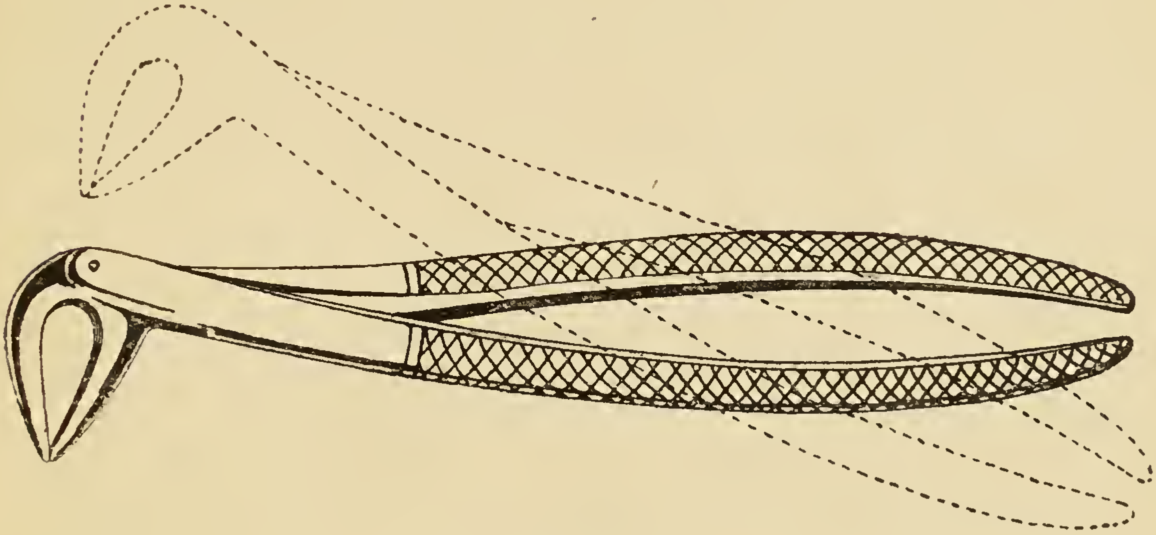
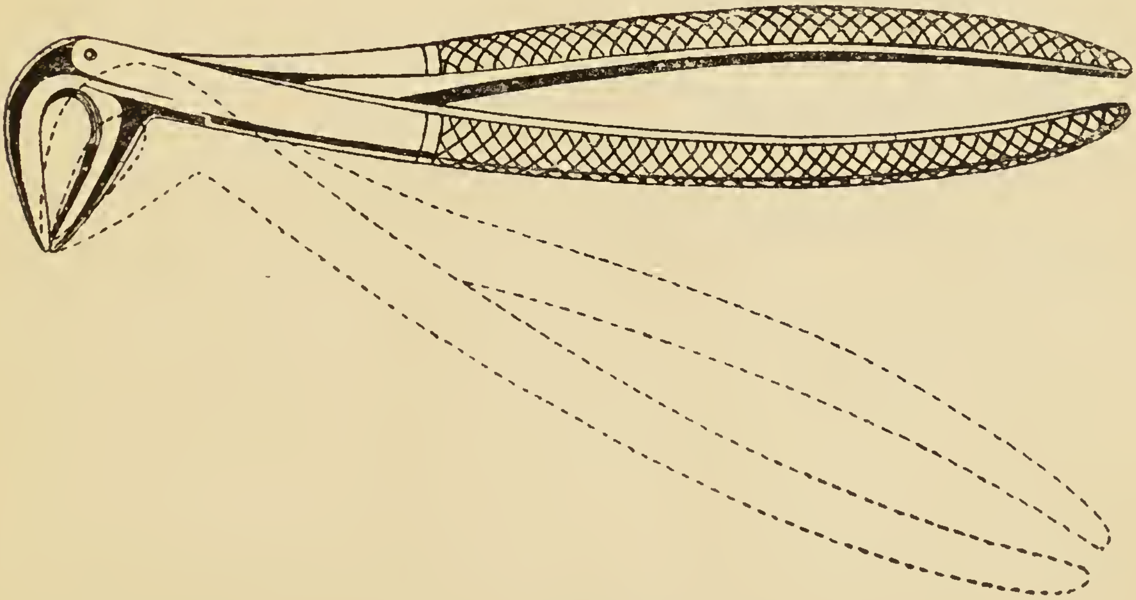


FIG. 2.—Hawk's-bill Lower Incisor Forcep.

As this is the first occasion of describing the method of using the hawk's-bill pattern forcep in the lower jaw, one or two important principles connected with its use may here be aptly noted. It cannot be too strongly urged that the proper use of the instrument depends almost entirely on the wrist. After the tooth has been grasped, the movement from the wrist and arm should be directed, as it were,



Right way.



Wrong way.

FIG. 3.—Right Way and Wrong Way of Using the Hawk's-bill Lower Forcep.

to lifting the patient up from the chair by the tooth. This lifting motion is never to be used alone, but always in combination with an inward or outward bias—in the majority of cases it is outward. The use of the hawk's-bill forcep, should therefore connect it, in the mind of the operator, with a lever of the first or simplest order, in which the fulcrum is the forefinger of the hand using the instrument. The preceding diagrams will make more clear, perhaps, the point upon which the author desires to lay stress.

The removal of the temporary lower incisors does not call for any special notice ; they are nearly always very loose, but as the crowns of the permanent incisors frequently appear very close to them when in this condition, due care should be taken that the enamel of the permanent teeth be not injured.

CHAPTER IV.

OF THE REMOVAL OF THE UPPER CANINES.

THE instrument used for this operation may be the same as described above for the upper incisors, or of the straight pattern, that is, a forcep with the blades and handles in one plane; but whichever is used, it should be a well-tried instrument, for the canine, being usually a large tooth with a stout root deeply implanted, flattened somewhat on its mesial and distal aspects, and surrounded by thick alveolar plates, offers very considerable resistance to attempts at removal. The forcep being applied to the neck of the tooth, the handles must be firmly held, and the tooth first moved outwards and then inwards once or twice, followed by an attempt at rotation, which, however, is not very often possible, and the inward and outward movement will probably have to be repeated. This, with the greater force used in an outward direction, will effect the dislocation of the tooth; it being understood that in the case of the canines, as with the incisors, the tooth is to be pulled from its socket at the same time as the other necessary movements are made.

The upper temporary canines never present any difficulty, but the root being in nearly all cases completely absorbed, care should be taken not to push the forcep beyond the margin of the gum.

OF THE REMOVAL OF THE LOWER CANINES.

As with the lower incisors, so the removal of the lower canines is rarely accompanied by any trouble, except that caused by the greater resistance of the tooth according to its variation in size and length. In extracting this tooth, however, the outward movement will be found of little value, and reliance must be placed on the lift of the arm, accompanied by rotation; the lower canine root being much less flattened than the upper, its removal is facilitated greatly by this latter movement. Indeed, so truly conical is the root sometimes, that it will often leave the socket suddenly on the closure of the handles of the forcep. The operator should be particularly wary of this occurrence, as it may not only be productive of an unpleasant contusion of the thumb, by its being included in the handles of the forcep, but also by reason of the possibility of leaving the tooth or root loose in the mouth, a matter which, particularly when operating under a general anæsthetic, must always be regarded with the utmost seriousness.

The removal of the lower temporary canines does not call for any special remark.

CHAPTER V.

OF THE REMOVAL OF THE UPPER BICUSPIDS.

THERE is considerable difference of opinion as to which is the most desirable instrument for the purpose of this operation: the two instruments already mentioned in connection with the upper incisors and canines are in common use.

The author must express a decided preference for the Read's pattern forcep, considering that the eccentric notion before mentioned to be of the greatest assistance in the operation. The first upper bicuspid is probably, with the exception of the third lower molar under certain circumstances, the most difficult tooth in the mouth to remove successfully and intact.

It is here necessary to consider a point around which a good deal of controversy has been waged, viz., as to what is the most suitable position for the operator in extracting teeth from the first bicuspid to the second molar in the upper jaw.

It is usually taught at the present day that the operator, standing on the right of the patient and bending slightly in front, should place the thumb and first finger of his left hand on the inner and outer alveoli, supporting the tooth to be removed. This method and position is doubtless in good style, but, with submission, it may perhaps be suggested that this is not the only thing to be aimed at in the successful removal of a tooth, and that far more practical success will be obtained by the old-fashioned, but less showy, method of passing the left arm around the head of the patient, thereby fixing it immovably to the head-rest and enabling the necessary movements to be made with far greater nicety and control than is possible in the modern way, and more particularly is this the case with teeth on the left side.

The forcep then, being adjusted to the neck of the bicuspid, should be driven up "as though it were intended to come out at the top of the patient's head," to use the expressive words quoted by Mr. Tomes, and a lateral, inward and outward movement repeated until the tooth be felt to loosen in its socket, the bulk of the movement being outward, and the tooth at the same time being drawn downwards. A slight, but very slight, rotation is often of assistance in those cases in which the two roots are amalgamated, but as this condition cannot, of course, be diagnosed, it is perhaps more desirable to trust to the lateral motion; but a movement of the hand holding the forcep in a circular direction, describing a slim cone, of which the tooth forms the apex, may be mentioned as a useful hint.

The most expert of operators will not succeed in always removing the tooth without accident, and it may be said, as a general rule, that should the point of one of the roots be broken off it may be left with a fair assurance that it will not give rise to any trouble, and therefore, unless there is any special reason for acting differently, no attempt should be made to remove it until the trouble arises.

This general rule applies not only to this tooth but to any other case of a like nature. It may be looked upon as the worst of bad policy to extensively injure the deep parts of a tooth socket, when there is by no means a certainty that the object of it will be attained, unless there be some special reason for so doing.

The second upper bicuspid does not call for any particular notice; the remarks made above in alluding to the first bicuspid apply also to the second, except that rotation will be found of little value, and, indeed, is mostly impossible.

A class of case often presents itself in which either the buccal or lingual part of the crown is absent, having decayed or broken away, possibly considerably below the gum margin.

In the case of the first bicuspid, great difficulty is often experienced, and the most useful form of forcep will be found to be one of the same general shape as Read's, but somewhat smaller, having the blades lighter and more in the same straight line with the handles. They should be used in the following manner: First, one blade should be adjusted to that side of the tooth of which most remains; this will steady the instrument while the edge of the other side is felt for with the other blade. Having secured this the forcep should be forced home as far as possible and a firm and continued gradual movement made in the direction of the obscure side. The object of this is manifest, the blade of the forcep which is upon the sound side cannot slip off, whilst the opposite blade is driven still deeper; also, in many of these cases the alveolus becomes disintegrated as decay of the root goes on, and is therefore the weaker on that side. The movement indicated may now be reversed, but not to any great extent; this will allow of the first blade being pressed still higher, and the first movement then repeated, but nothing in the nature of withdrawal should be attempted until the root is felt to be loose, rather should the tendency be to force the root, as it were, further into the socket. This method is nearly always attended with success, and reference will be made to it again when considering similar cases in molars.

CHAPTER VI.

OF THE REMOVAL OF THE LOWER BICUSPIDS.

CONCERNING this operation little need be said, as it is in most particulars the same as the lower canines, and the same instruments should be used; but it will seldom be found that any inward or outward movement is of much avail, and such movement should be attempted with care, the removal being effected almost entirely by slight continued rotation either way, with the lifting force referred to in connection with the extraction of the lower canine; and the same caution is necessary as in the case of that operation, lest the bicuspid leave its socket suddenly, and also that in such a case the forcep does not strike any upper tooth so violently as to cause it injury. Roots of lower bicuspids, especially those which have remained alone for some time, frequently become surrounded with such dense alveolus as to present considerable obstacles to easy removal.

In these cases reliance must be placed, firstly, on a well-tried instrument, the edges of whose blades have been ground to a sharp but wedge-like edge, which should be fairly adjusted to the edges of the root and forcibly driven down, while the fingers of the other hand support the lower jaw from below ; the root may then usually be extracted by rotation ; but if, as often happens, the blades cannot be driven sufficiently far to obtain firm hold, recourse must be had to other methods, the first of which, perhaps, should be to adjust one blade on the most distinct side of the root, the other being outside the opposite alveolus, but between it and the gum. After the blades have been forced down as far as possible the handles of the forcep should be squeezed together tightly, in order that the edges of the blade may cut through the alveolus and the root be coaxed from its socket.

It may happen that in such cases the lingual and buccal edges of the root may be indistinct, but the mesial and distal edges much less so ; and when this is the case an attempt may be made upon it with the elevator, in a way to be described in another place.

The position of the operator is the same as that to be described in treating of the removal of lower molars (p. 30).

A point of great practical value in operating under an anæsthetic may be noted here, that only two forceps have been described as really necessary for the extraction of the teeth from central incisors to second bicuspids—one for either jaw.

CHAPTER VII.

OF THE REMOVAL OF THE UPPER MOLARS.

FOR the purposes of this operation some surgeons prefer light forceps, and others heavy ones, but here again it may be advised that whether the handles be light or heavy the blades should have a tendency to stoutness rather than the reverse, and that the edges of the blades be not too thin, or the point of the buccal blades too long, as, however excellent the make of the forcep, these parts are almost certain to yield if too light, with a corresponding lessened efficiency of the instrument.

In speaking of the upper bicuspids (p. 16), the most desirable position of the operator with regard to those teeth, and also upper molars, was remarked upon, and the reader's attention is again drawn to that description.

The forcep being carefully adjusted to the neck of the tooth, so that the point of the buccal blades passes under the gums at the point corresponding to the division between the two roots, should be forced upwards as far as possible, and a steady, careful, and continued outward movement made, accompanied by a downward pull or withdrawal motion until the external alveolar plate is felt to give way; should this not be the case after a reasonable amount of force has been exerted, a slight inward movement may be made, unaccompanied, however, by any downward pull, and then the first motion renewed. As soon as the alveolus is felt to yield the hand should be supinated slightly

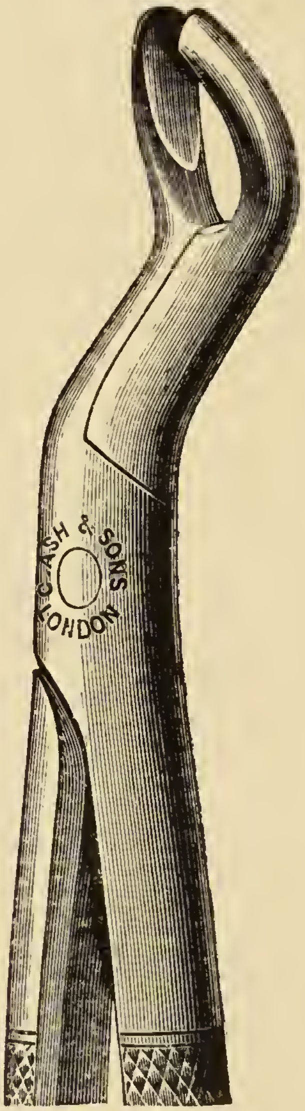


FIG. 4.—Long Bayonet Upper Wisdom Forcep.

if on the right side, or pronated if on the left, so as to give the forcep a slight twist as the tooth is withdrawn. The same treatment applies to the second upper molar, but the twisting action last spoken of may be increased a little with advantage. The removal of the third upper molar or wisdom tooth may be accomplished with the same instruments as the first and second, but it is very desirable to have a special one for this tooth of bayonet pattern, both blades being crescentic and equal in shape (fig. 4).

Of the long and short bayonet patterns each operator will suit his fancy, the author's preference being for the long, as affording a much better view of the tooth.

The position of the operator is always somewhat in front of the patient, the forefinger of the left hand being used to keep the cheek away on both sides.

The operation itself is never accompanied by any difficulty, except perhaps in those very rare cases in which the tuberosity is adherent and has been brought away with the tooth. The necessary movements are the same as for the first and second molars, but the supination or pronation of the hand, as the case may be, should be much increased and is of the greatest utility.

When treating of the removal of the bicuspids, reference was made to a class of cases in which either the inner or outer wall alone was standing, the opposite one being broken away or disintegrated below the gum margin. The remarks made there (pp. 17 and 18), and to which, to avoid repetition, the reader is referred, apply to similar instances in the case of the molars. The same instrument may be used, but a better, is one in which the blades are more separated when closed, so that when adjusted to a large molar the handles will not be so widely open as to interfere with a firm grasp of them.

The outer blade being adjusted to the anterior root, the edge of the palatine root is sought for with the inner blade and the instrument forced as high as possible, the subsequent procedure being the same as in the case of the bicuspid, and to which reference is made.

Those cases of large and strong molars which have decayed to the gum margin, and still more those which have gone further and show a large basin-like cavity between two adjoining firm teeth, sometimes present great difficulties to even the expert. If, in the remains of the tooth the edges are sound and well defined, and it is judged that the roots are still firmly attached to one another, the full molar forcep should in all cases be tried.

Particular attention may, perhaps, with advantage be called to the fact that too little reliance is placed on this first method, the tendency being to apply the root forcep at once if the tooth is considerably decayed; this is much to be deprecated, and the full forcep will, in a very great many instances, give far greater satisfaction to the operator, and far less suffering to the patient. Many cases which only become more and more cone-like after each unsuccessful application of the root forcep could be quite easily removed with the full molar instrument.

If, however, the tooth be so hollowed out that the junction of the roots has become very frail, some other method must be resorted to. Many instruments have been devised to meet this difficulty, such as a full forcep, modified by having the point of its external blade continued as a long spike, or the external blade, as a blade, even done away with altogether and taking the form of a cow's horn; and others invented for dividing the two external roots by having the outer blade fashioned in the form of a cutting wedge, &c. The author has, however, had but little success with these, and is unable to personally recommend them, while admitting that they may be of service in the hands of those having had more practice with them.

Excluding these instruments, then, reliance must be placed on stump forcep or the elevator: the description of the use of the latter will be found in the chapter devoted to the consideration of that important instrument.

The stump forcep which seems most desirable for this class of case is the same as before—the Read's pattern—and to habituate oneself to the use of this instrument for the purpose confers the great advantage of not requiring a change, should there be other operations necessary at the same time.

The mode of procedure will be the same as described when speaking of a molar decayed unilaterally ; thus, the blades of the forcep should be adjusted to the margin of the palatine root on the one hand, and to whichever of the external roots may seem the stronger on the other, and the instrument then pressed home. A word of warning may not be out of place at this point, lest the bone around and at the floor of the antrum, being much softened by chronic inflammatory processes, yield to the pressure, and the forcep not being under proper control be forced, together with the roots, into the cavity of the antrum. It is impossible to lay down any rule with regard to the movements which are most efficacious in bringing about the removal of molar roots in this state, each case must be treated on its merits. In some cases, if the handles of the forcep be shaken from side to side, the roots will drop from their beds. In a large number of cases, however, the blade of the instrument will crush through the weaker of the two roots and pass on to the sound one, which may then be easily extracted, the others being afterwards removed individually. In the majority of these cases it is not difficult to obtain two roots together, leaving the third to be treated singly.

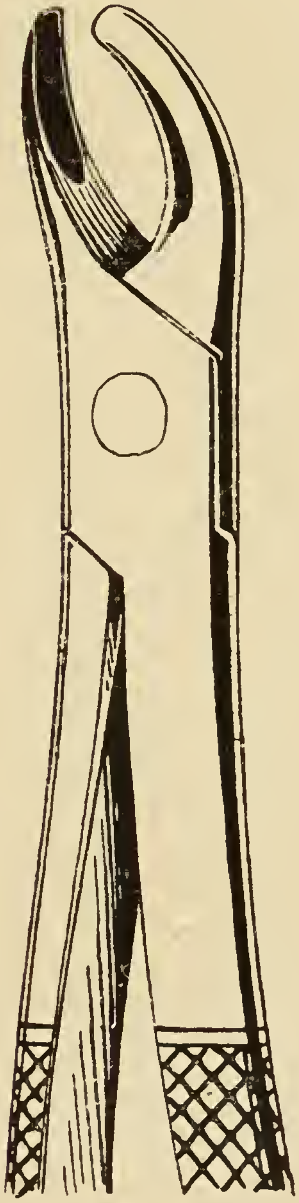


FIG. 5.—Author's Temporary Upper Forcep.

The removal of the root of a wisdom tooth in the upper jaw does not call for any special notice, but it will nearly always be found necessary to use a special instrument of bayonet shape, as described for the full tooth, the blades, however, being of the same general pattern and breadth at the tips as the Read pattern root forcep.

The movement for extraction is the same as that for the tooth itself. The bayonet-shaped stump forcep alluded to will be found very useful also for those anterior roots of upper molars which are imbedded close behind another molar tooth, and which are not very easy to reach with the shorter forcep.

For the removal of the deciduous upper molars it is not desirable to use the full forcep, and whatever instrument be used, care should be taken not to press it too high ; indeed, such action is contrary to necessity, as, owing to the absorption of its roots, the most substantial implantation is at its neck or a little below. A lightly made instrument, shaped like an upper molar forcep, but with the tips of the blades crescentic, as in the wisdom forcep, and about half to two-thirds the width and weight of it, suggests itself as the most suitable instrument for the object in question (fig 5).

CHAPTER VIII.

OF THE REMOVAL OF THE LOWER MOLARS.

THERE is probably more difference of opinion concerning the instrument to be used and the method to be employed for this operation than for any other, the older school of dental surgeons pinning its faith to the straight forcep, or that which is used for both sides from the front; the modern school relying on the hawk's-bill pattern, which, it cannot be gainsaid, is much more scientific in theory and practice than the former, as with it there is unquestionably more power and control over the direction of the force than is possible with the straight instrument. The greatest force necessary for the extraction of the lower molar being obviously in the upward, or lifting, direction, it is patent that this is not most easily obtained with the straight instrument, in addition to which, the awkward position of an operator with the latter invariably intercepts the light and the proper view of the tooth.

While it may be said that the hawk's-bill forcep seems by far the superior instrument for the end in view, it is by no means suggested that practice in the use of the alternative instrument should be entirely discarded ; indeed, the student may be strongly advised to cultivate its use with assiduity, as many cases will be met with in which its use will be of value, but as the principles governing its proper use are identical with those of the instrument, whose use will be mainly considered here, they will not again be referred to.

The position of the operator in removing the lower molars of the right side should be behind and leaning over the patient, the chair being in the lowest position possible. The tooth to be extracted is to be isolated between the thumb and forefinger of the left hand, the thumb being on the lingual and the forefinger on the buccal aspect ; the rest of the fingers of the hand should support the maxilla from below as much as possible. In operating on teeth on the left side, the operator should stand in front of the patient, with his right leg touching the foot-rest. The thumb is used in this instance to support the maxilla from below, while the first and second fingers are laid along the outer and inner sides of the tooth respectively, to guard the cheek and tongue from injury. The positions here described are equally applicable to the lower bicuspids.

The blades of the hawk's-bill forcep being then applied to the neck of the tooth, should be forced down as far as possible, the tooth being then firmly grasped, and through the wrist and shoulder lifted upwards and at the same time, as in the case of the first molar, a little outwards, the resultant of the two forces being as shown in the accompanying diagram (fig. 6).

Should the tooth not yield to this, similar force inwards may be tried; but it is in the outward direction that the first molar will eventually be removed. In the case of the second molar the lifting action is still the main one, but the accompanying movement should be first in the inward direction, and although in the majority of cases the tooth will eventually yield to outward force, there will be found many which will more readily give way to movement inwards.

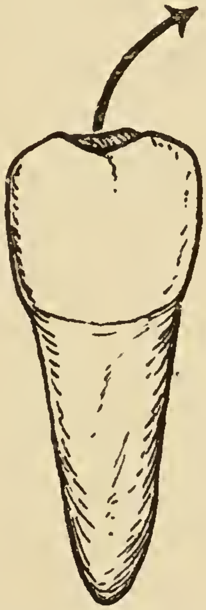


FIG. 6.—Lower Molar Tooth and Line.

For the third molar the elevator is pre-eminently the best instrument, giving as it does just the direction of force required, owing to the backward curve of the third molar root, the dense bone behind the neck of the tooth forming an excellent point *d'appui* upon which it may be turned out of its socket. The third molar may often be reached with the same instrument as that used for the first and second, and with it the same procedure will obtain as for the second, except that the force employed should always be inwards; but it is for this tooth that ability to use the straight molar forceps will be found useful. Great care must be taken in using it lest a portion of the tongue or cheek be included.

The operator must stand as much in front of the patient as the foot-rest will allow. In operating on the left side of the mouth, the thumb of the left hand should be used to depress the tongue, and on the right side to keep away the cheek. The blades of the forcep should close upon the crown lightly before they are pressed home. The removal of the third molar when impacted is often beset with great difficulty, and it will seldom be found that much success will be derived from the use of any kind of forceps in a real case of impaction, and reliance must be placed on the use of the elevator, to which attention will be directed in the following chapter.

CHAPTER IX.

Of the Elevator and its Use.

Elevators may be divided into two classes, the straight and the curved, each of which may be modified in various ways : thus, the straight variety may have its blade bent over on the flat at a more or less obtuse angle, but always with the face of the blade and the shaft in the same direction ; the curved elevator, in which the face of the blade is at right angles to the shaft, may be made still more angular by bending the shaft in various ways.

As with forceps, each operator will have a fancy for some particular form of instrument, but the most useful would appear to be a set of four, as illustrated (fig. 7).

In the first the blade is flame-shaped, with a not too sharply defined point. The face of the blade may be either flat or concave, while the reverse, or back, of the blade is convex, and the edges for about two-thirds of the length from the point should be quite sharp. This instrument is straight from point to handle.

The modified form of the instrument, and perhaps

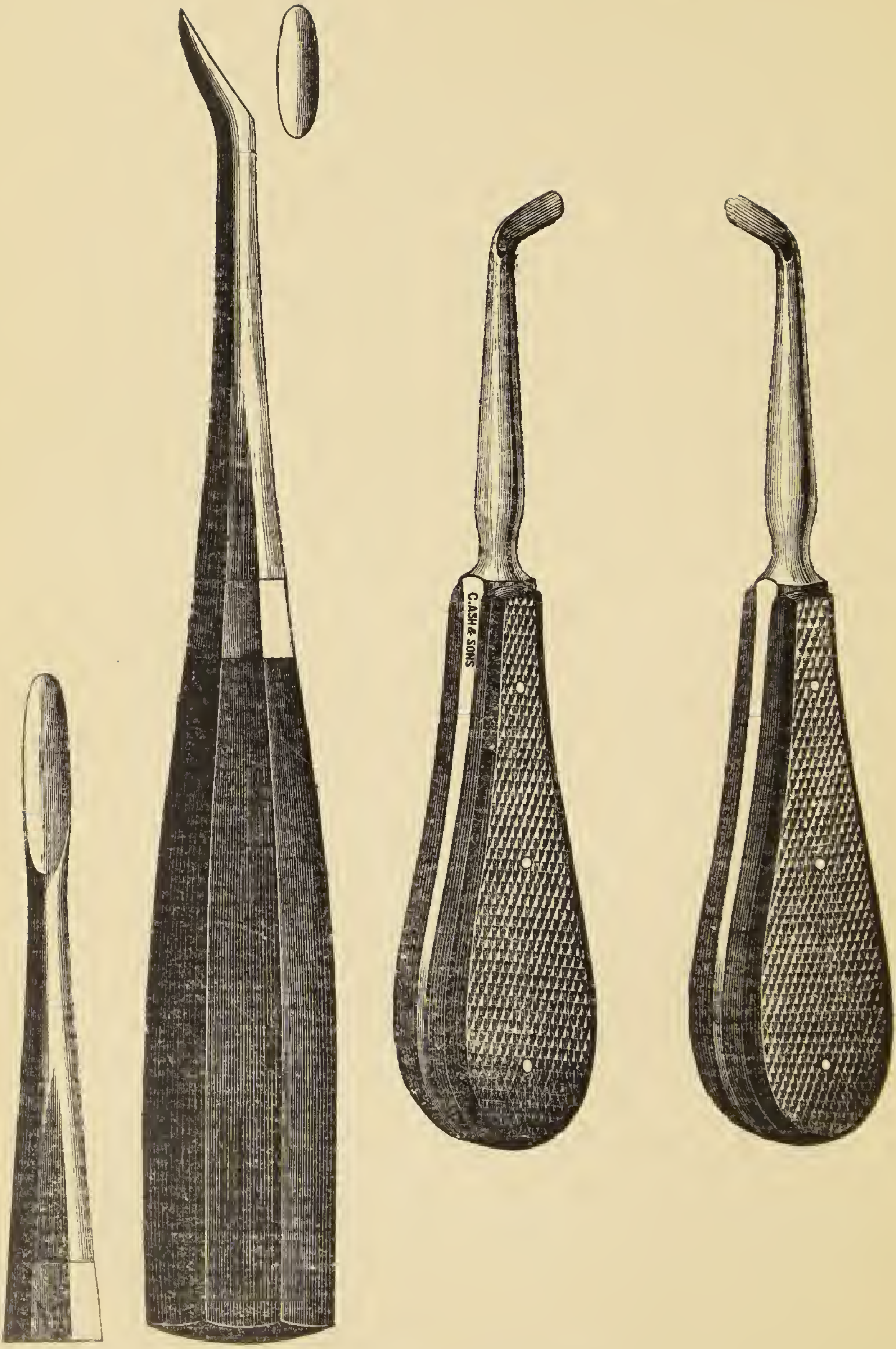


FIG. 7.—Author's Four Elevators.

the most useful for lower teeth, is one in which the blade is bent at an angle of 45° in such a manner that its face is still in the same line as the shaft, but presents forwards and upwards, the back of the blade looking backwards and downwards.

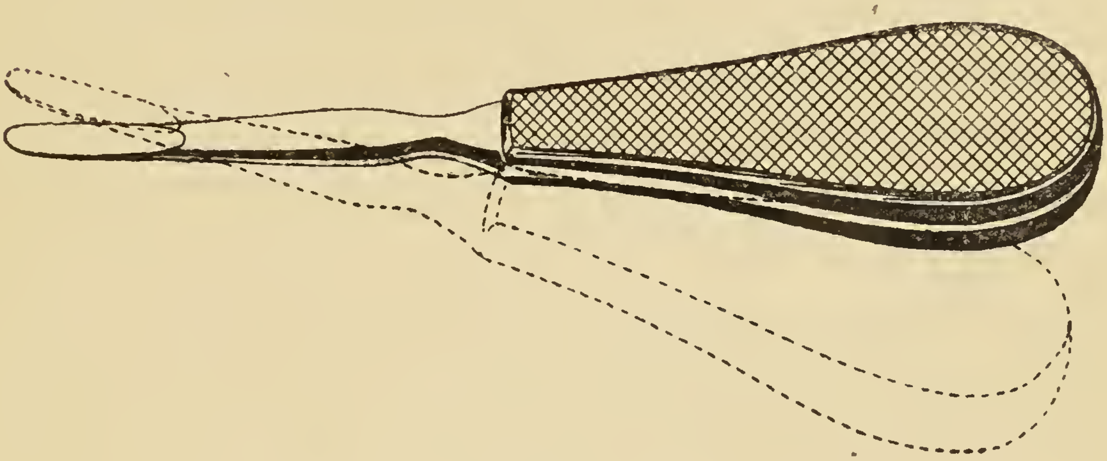
In the curved elevators (Nos. 3 and 4), which are made for right and left sides, the blade is constructed in such a way that while it makes rather more than a right angle with the shaft, its face presents laterally and should be slightly curved upon itself. If, in addition, the shaft just above the angle be bent out of the straight a little upwards and backwards, the instrument, from point to neck of shaft, will have the form somewhat of a quarter turn of a spiral ; and this appears to be the most efficient form of curved elevator.

The handles of all elevators should be of bulbous pattern, and of sufficient size and length to be firmly held in the hollow of the hand when the forefinger is laid along the shaft in the same way as a cabinet-maker properly holds a bradawl. It is not customary to use the elevator for teeth anterior to the upper molars and lower bicuspids, but this should by no means be regarded as a rule. The action of the elevator is that of a lever of the first order, in which the fulcrum is between the weight and the power ; and in this fact lies the key to the proper use of the instrument.

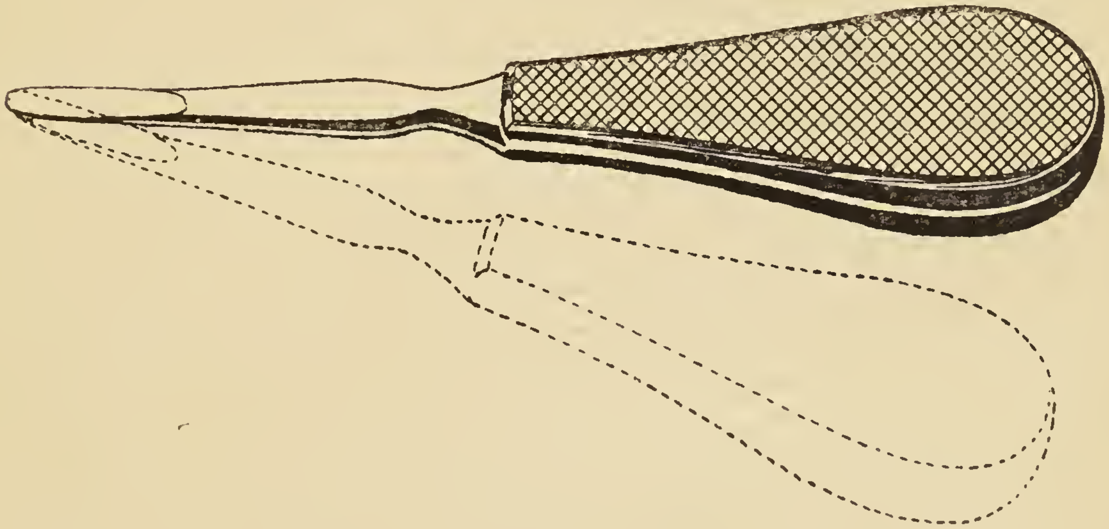
From this statement it will appear, at first sight, that the fulcrum is either an adjoining tooth or the alveolar border, and, as a matter of fact, in nearly all cases, at any rate with the straight elevator, this is so; but it cannot be too strongly emphasised that the fulcrum should not be entirely on these parts, and that the forefinger in the case of the straight elevator, and the thumb in the case of the curved one, must be made to bear a great part of the pressure at this point, lest untoward injury of the surrounding parts occurs.

When the elevator, held in the manner above indicated, with the forefinger laid along the shaft to avoid the possible consequences of a slip, is inserted between the alveolus and the root to be removed, it should, after being pressed down as far as possible, be slightly turned away from the root, in order and in such a manner that its sharp edge near the point may cut into and take hold of the cementum; the handle should then not merely be depressed, but depressed in such a way that the point of the instrument may rise, the fulcrum being, as before mentioned, the point of the forefinger as much as possible: this also applies to the angular form of straight elevator. The following diagram will make more clear the proper method of utilising the necessary force (fig. 8).

The method of using the modified or bent form of the straight elevator does not differ materially from the other, except that it can only be used upon the anterior aspects of roots. The curved elevator is best held with the thumb laid along the shaft, as in this manner the direction of the force may be best controlled. The handle of the instrument being firmly grasped in the hollow of the hand, the forefinger will be curled round the shaft, so that the second phalanx will abut against the alveolus in the unfortunate event of a slip.



Right way.



Wrong way.

FIG. 8.—Method of Using the straight Elevators.

In using the curved elevator, the method of extraction may be likened to a scoop, the tip of the blade being inserted between the edge of the root and the alveolus, and the handle rotated so that the sharp edge of the tip of the blade may take hold of the cementum, and the root be forced from its socket. The same method of procedure will obtain, of course, whether the right or left instrument be used, and whether on the anterior or posterior aspect of the root.

It sometimes happens that one or the other root of a lower molar may be easily removed with the root forcep and the remaining root be left considerably below the gum margin. In these cases there is great temptation to insert the elevator into the vacant socket and to force it through the intervening septum to the root and so prize it out, but this method, leading as it does to what may be unnecessary destruction of alveolar tissue, should not be adopted until the orthodox way has been tried and has failed.

There are occasional cases in which it is most difficult and even impossible to obtain sufficient hold of either root with the forcep, and in which no impression can be made with elevators used in the way above described ; in these cases, one of two other methods may be tried.

In the first of these the straight instrument should be held like a bradawl, and with the forefinger carefully guarding the movement, an attempt should be made to bore between and divide the two roots from the top; if this is successful, the posterior root may be easily turned out by using the anterior one as a fulcrum, and subsequently removing the latter in the usual way.

In the second case the division may be attempted by placing the sharp point of the elevator at a position on the outer margin of the roots corresponding to their junction, and boring down between it and the alveolus until the blade is felt to be well between the two roots, when it should be rotated; the two roots will be separated from each other by this, and frequently one or the other of them will leave its socket at the same time.

In using the elevator in the upper jaw much greater practice is required to guard against slipping, and until the operator has become quite expert in the use of the instrument it should not be attempted.

There is but one class of case in the upper jaw in which the elevator is more useful and more to be desired than the forcep, namely, the class in which the molar is badly broken down, leaving the three roots more or less attached to each other. In these cases the operation may be more easily commenced, with less damage to the surrounding parts, with the straight elevator than by the forcep.

The operation should be begun on whichever of the external roots may be stoutest, or upon whichever of them may have a sound tooth in juxtaposition which may serve as a fulcrum. The point of the elevator being insinuated between the root and the next tooth, the root may be easily levered out, and a similar method practised upon the second one, the palatine root being then removed with the root forcep.

Another way of treating this class of case is similar to that spoken of in connection with the lower molar roots, by placing the point of the instrument at a position on the margin of the gum corresponding to the junction of the two external roots, and then boring upwards and inwards, after the manner of using a bradawl, until the point is felt to enter between the roots ; one or other of them may then be turned out and the others removed in any way found simplest, the chief difficulty being overcome in the removal of the first root. Not infrequently, after the elevator has been inserted as described, all three roots may be literally pulled down if the junction be still strong enough.

It might appear at first sight as though this method of boring, if it may be so termed, between the roots is likely to be productive of considerable damage to the alveolus and gum, but it is not really so in practice, and it must be remembered that the alveolus must in any case be absorbed, and the resulting wound is neither so large nor so jagged as that brought about by the lacerating effects of forceps applied, often futilely, several times.

CHAPTER X.

OF THE REMOVAL OF MISPLACED TEETH.

It is obvious that the varieties of misplaced teeth are so numerous that it is quite impossible to give any fixed or even approximate rule for the removal of such teeth. Fortunately, the difficulties of the operation are more apparent than real, and such cases only need to be attacked with confidence and without fear, and with such intelligent application of the usual methods of extraction hereinbefore described, to demonstrate how easy in reality most of these cases are. Mention, therefore, will only be made of a few of the more common abnormalities, among the first of which is the case of the upper canines standing or erupting outside the arch between the lateral and bicuspid.

As a matter of convenience, the best instrument for their removal will be found in the straight incisor forcep, and it should be applied laterally, that is to say, with the blades on the mesial and distal aspects of the tooth and, of course, as far up as possible; lateral and outward movement will in all cases suffice.

Perhaps the next most common case is that in which one of the lower incisors is crowded out and stands either in front or behind the arch. In these cases the operator is in the best position when standing behind and to the right of the patient, as described for the lower molar; the lower hawk's-bill forcep should then be applied laterally, and force used as may be deemed best, with a view to avoiding injury to any adjoining teeth.

Next in order of frequency is probably the case of the upper bicuspid erupting, owing to want of room, inside the arch; it does not call for special treatment, the lateral method of using the straight instrument may be employed, or a slim pair of Read's forcep used in the usual way.

The lower bicuspids, usually the second, frequently erupt through the inner alveolar plate and cause soreness to the under-surface of the tongue, or interfere with speech. These may be easily reached with the Read's upper stump forcep, or that of the bayonet pattern, and although their roots are not uncommonly curved, they are generally quite easy of removal.

Other cases of malposed teeth must be left to the individual ingenuity of the operator. In practice it will be found that cases calling for any special forcep beyond those ordinarily used for extraction are very rare.

CHAPTER XI.

COMPLICATIONS AND SEQUELÆ.

A SMALL treatise of this kind is not the proper place for an extensive discussion of the accidents which may follow the extraction of a tooth, for they are many; some two or three of them, however, being common, may fall within the scope of this book, while others, more or less rare, may be left to larger and more essentially surgical works. Great pain following removal of a tooth, and sometimes lasting for a week or more, not uncommonly results in cases of periostitis and abscess, and is so frequent after long-standing chronic periostitis, that it may almost be regarded as a regular part of the operation to apply some remedy in anticipation as soon as bleeding has subsided. In these latter cases a pledget of cotton-wool soaked in a saturated solution of cocaine in oil of cloves should be inserted in the socket, and the patient instructed to use hot poppy-head fomentations in the mouth at frequent intervals.

In the former more acute cases of periostitis the same fomentations are of value, but the socket should not be plugged, as such a course only serves to stop the hæmorrhage, which it is more desirable to encourage. The patient should be given an antiseptic mouth-wash, and should the socket, as is frequently the case, become plugged with *débris,* it should be energetically syringed with the same.

Hæmorrhage continuing for any considerable time should be at once dealt with, not only on account of the loss of blood, but also on account of the mental effect produced upon the patient, who easily passes into a state of alarm bordering on panic, and in order to allay this as much as possible, the surgeon's manner should be calm and collected, and in no way betray haste or surprise.

If the trouble does not yield to the usual applications of heat or cold, which should be first tried, arrangements should be at once made to plug the socket. For this purpose a strip of lint, half an inch wide, and from three to four inches long, should be taken and slightly moistened with water ; this should be laid on a slab upon which ferropyrine has been thickly strewn, and more of the drug sprinkled on the upper surface and smoothed over the strip with a spatula until it is well incorporated. The socket being well syringed out, one end of the strip of lint should be carried boldly down to the bottom of the cavity, and the remainder folded in and packed down until the cavity is full, any surplus should then be folded over the top of the socket so as to form an overlay ; a cork must then be placed on this, and the patient instructed to keep up gentle pressure by biting upon it : if any doubt exists as to the patient's force of will in this particular, it should be set at rest by putting on a four-tailed bandage. It should be mentioned that the cork need not be too large, but only just sufficiently so as to prevent the other teeth from closing.

It is of the greatest importance that the patient's friends should be instructed not on any account to speak to him, nor to administer food of any kind for at least six hours, and then only such as does not require mastication, such as porridge, milk pudding, beaten up eggs, &c. In nearly all cases this treatment will be effectual ; if it is not, it will pass out of the hands of the dental surgeon and therefore need not be further considered here.

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